

### **Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

### **Listing of Claims:**

1. (Currently amended) A mixing apparatus comprising:  
a swirl chamber having an outlet; and  
a distribution network in fluid communication with, and downstream of the outlet, having  
a plurality of fluid guides extending outwardly relative to the outlet, and a  
plurality of bubble caps having a plurality of riser vanes; and  
wherein the outlet and the fluid guides are disposed in a hub and spoke configuration.
2. (Original) The mixing apparatus of claim 1 in which the swirl chamber is disposed to receive a material from a plurality of openings, each of which is fitted with a member that at least partially directs the material in a swirling motion.
3. (Original) The mixing apparatus of claim 1 in which the swirl chamber is disposed to receive a material from a plurality of openings, each of which is fitted with a ramp sloping downward in a direction of flow into the swirl chamber.
4. (Original) The mixing apparatus of claim 1 in which the swirl chamber is fitted with a plurality of wall baffles.
5. (Original) The mixing apparatus of claim 1 further comprising a collection tray having a plurality of floor baffles upstream of the plurality of openings.
6. (Original) The mixing apparatus of claim 1 further comprising a pipe that feeds a quench material into the swirl chamber.
7. (Original) The mixing apparatus of claim 1 wherein each of the plurality of bubble caps further includes a riser and a cap, positioned such that the riser vanes are located between the riser and the cap.
8. (Original) The mixing apparatus of claim 1 wherein the plurality of riser vanes are spaced apart from each other to define a plurality of vane passageways.
9. (Original) The mixing apparatus of claim 1 wherein the riser vanes are flat, curved, or cut at an angle.
10. (Canceled)

11. (Original) The mixing apparatus of claim 1 in which the swirl chamber has a wall that includes a plurality of openings that receive a material and impart a swirling force to the material, and a ramp sloping downward in a direction of flow into the swirl chamber.
12. (Original) The mixing apparatus of claim 11 in which the wall is fitted with a plurality of wall baffles, and further comprising a collection tray having a plurality of floor baffles fluidly communicating with, and upstream of the plurality of openings.
13. (Original) The mixing apparatus of claim 1 wherein the fluid guides are also radial support beams that support the swirl chamber.
14. (Original) The mixing apparatus of claim 1 further comprising a splash plate fluidly interposed between the outlet of the swirl chamber and the distribution network.
15. (Original) A multizoned vessel having a mixing apparatus according to claim 1 fluidly interposed between a first reaction zone and a second reaction zone.
16. (Currently amended) A bubble cap comprising a riser, a cap, and a plurality of riser vanes, wherein the riser, the cap, and at least one of the riser vanes are configured such that a first and a second fluid mix in the bubble cap during concurrent flow through the bubble cap.
17. (Original) The bubble cap of claim 16 wherein the riser is disposed upstream of the plurality of riser vanes, and the cap is disposed downstream of the plurality of riser vanes, relative to a fluid flowing through the bubble cap.
18. (Original) The bubble cap of claim 16 wherein the plurality of riser vanes are spaced from each other to define a plurality of vane passageways.
19. (Original) The bubble cap of claim 16 wherein the riser vanes are flat, curved, or cut at an angle.
20. (Original) A mixing apparatus comprising a distribution zone that includes the bubble cap according to claim 16.
21. (Original) A mixing apparatus comprising a distribution zone that includes the bubble cap according to claim 18.
22. (Withdrawn) A mixing apparatus comprising:  
a collecting stage that combines a substantial gas phase fluid and a substantial liquid phase fluid to form a mixed phase fluid;

a swirl chamber downstream of the collecting stage that swirls the mixed phase fluid  
wherein the swirl chamber has an outlet;  
a distribution tray in fluid communication with, and downstream of the outlet; and  
a plurality of outwardly extending beams that physically supports the mixing apparatus.

23. (Withdrawn) The mixing apparatus of claim 22 wherein the outwardly extending beams support the distribution tray.
24. (Withdrawn) The mixing apparatus of claim 22 wherein the outwardly extending beams support the swirl chamber.
25. (Withdrawn) The mixing apparatus of claim 22 wherein the outwardly extending beams extend radially from a hub.
26. (Withdrawn) The mixing apparatus of claim 22 in which the swirl chamber is disposed to receive a material from a plurality of openings, each of which is fitted with a member that at least partially directs the material in a swirling motion.
27. (Withdrawn) The mixing apparatus of claim 22 in which the swirl chamber is disposed to receive a material from a plurality of openings, each of which is fitted with a ramp sloping downward in a direction of flow into the swirl chamber.
28. (Withdrawn) The mixing apparatus of claim 22 wherein the distribution tray is fitted with a plurality of bubble caps having riser vanes spaced apart from each other to define a plurality of vane passageways.
29. (Withdrawn) The mixing apparatus of claim 22 in which the swirl chamber has a wall that includes a plurality of openings that receive and impart to the material a swirling force, and a ramp sloping downward in a direction of flow into the swirl chamber.
30. (Withdrawn) The mixing apparatus of claim 29 in which the wall is fitted with a plurality of wall baffles, and further comprising a collection tray having a plurality of floor baffles fluidly communicating with, and upstream of the plurality of openings.